

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 62941A	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/US2004/029996	International filing date (day/month/year) 10.09.2004	Priority date (day/month/year) 03.11.2003	
International Patent Classification (IPC) or national classification and IPC C08G59/24			
Applicant UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY...et			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 19.05.2005		Date of completion of this report 08.11.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Kaul-Buchberger, E Telephone No. +49 89 2399-8296	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2004/029996

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-29 as originally filed

Claims, Numbers

1 as originally filed

2-8 received on 25.02.2005 with letter of 25.02.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☒ the claims, Nos. 1
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2004/029996

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	7,8
	No: Claims	1-6
Inventive step (IS)	Yes: Claims	
	No: Claims	7,8
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item I

Basis of the report

The amendments filed with the letter dated 25.02.05 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned are the following: "(a) applying a photocurable composition on said article; and (b) curing the photocurable composition;" introduced in claim 1.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The following documents are referred to in this communication:
D1 : EP 1 099 730 A (VANTICO AG) 2001-05-16
D2 : EP 0 051 311 A (UNION CARBIDE CORP) 1982-05-12
D3 : EP 1 285 938 A (GENERAL ELECTRIC COMPANY) 2003-02-26
- 2.1. Document D1 discloses (example 11 and claims 1-4) a powder coating composition comprising cured epoxy resins (epoxy compounds 12 and 14), which are identical to the epoxy resins defined in independent claims 1, 7 and 8. The resins are thermally cured and lead to tough coatings.
- 2.2. Therefore, the subject-matter of claims 1-6 lacks novelty in view of D1.
- 2.3. Document D2, which is presently considered to represent the most relevant prior art, discloses (page 2, lines 1-10, page 3, lines 1-5 and lines 15-17) a curable cycloaliphatic composition comprising diepoxides of cycloaliphatic esters of dicarboxylic acids, which are identical to the epoxy resins defined in independent claims 1, 7 and 8. The compositions are cured at elevated temperature (examples). The compositions are useful as transformer encapsulation. Furthermore, D2 discloses (page 11, lines 9-10) that hardeners for the epoxide compositions are present to effect cure.
- 2.4. The subject-matter of independent claims 7 and 8 differs from the disclosure of D1 or D2 in that a photoinitiator (claim 7) or a thermally-activated initiator (claim 8) is

present.

- 3.1. There are no examples on file, which show that the aforementioned distinguishing features lead to an unexpected technical effect and, thus, the objective technical problem solved by said features can only be regarded as to provide further curable compositions for encapsulates.
- 3.2. The addition of a photoinitiator or of a thermally-activated initiator to an epoxy resin to provide a photocurable epoxy resin is conventional (see, e.g., D3, which already discloses (page 7, lines 4-10, examples and claims 1, 5, 8 and 10) curable epoxy resins as encapsulate for LEDs, said epoxy resins comprise, e.g., 3,4-epoxycyclohexylmethyl-3,4-epoxycyclohexane-carboxylate and which are cured either by heat or by UV) and, thus, the subject-matter of independent claims 7 and 8 does not meet the requirements of Article 33(3) PCT.
4. For all claims (1-8) industrial applicability is acknowledged.

Re Item VIII

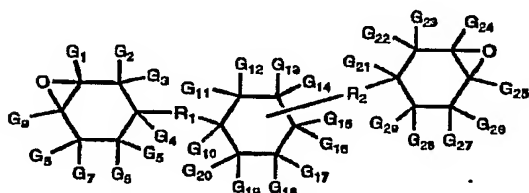
Certain observations on the international application

1. The phrase "enhancing the toughness of a coating on an article" of claim 1 can only be regarded as illustrative feature and not as technical feature, which is suitable to distinguish the present claims from the prior art.

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WHAT IS CLAIMED IS:

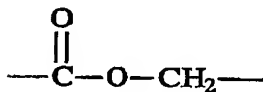
1. A method of enhancing the toughness of a coating on an article, said coating comprising a cured cycloaliphatic epoxy resin, said method comprising (a) applying a
 5 photocurable composition on said article; and (b) curing the photocurable composition; wherein the photocurable composition comprises an effective amount of a photoinitiator, and an epoxy resin compound of the following formula:



- 10 wherein R_1 and R_2 are divalent organic moieties that may be the same or different; and wherein G_1 through G_{28} is hydrogen; phenyl; or substituted or unsubstituted alkyl or alkene groups having from 1 to about 10 carbon atoms.

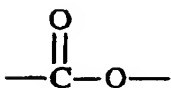
2. The method of Claim 1 wherein the cycloaliphatic epoxy resin comprises the
 15 reaction product of from about 40 to about 95 weight percent of a cycloaliphatic epoxide carboxylic acid ester and from about 5 to about 60 weight percent of the hydroxy functional compound.

3. The method of Claim 1 wherein R_1 is



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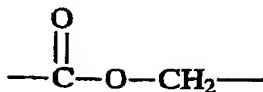
4. The method of Claim 1 wherein R_1 is



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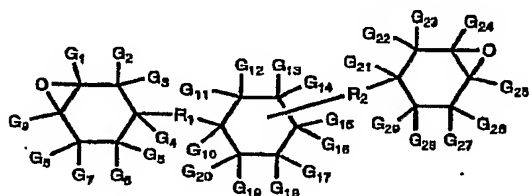
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5. The method of Claim 1 wherein R_1 and R_2 are each



6. The method of Claim 1 wherein each of G_{1-29} are hydrogen.

5. 7. A photocurable composition comprising an effective amount of a photoinitiator, and an epoxy resin of the following formula:

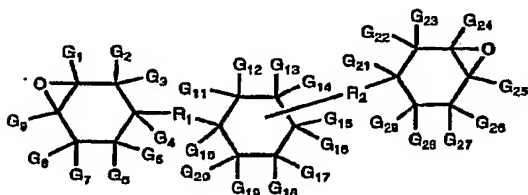


wherein R_1 and R_2 are divalent organic moieties that may be the same or different; and

- 10 wherein G_1 through G_{29} is hydrogen; phenyl; or substituted or unsubstituted alkyl or alkene groups having from 1 to about 10 carbon atoms.

8. A thermally-curable LED encapsulant formulation composition comprising an effective amount of a thermally-activated initiator, and an epoxy resin of the following

15 formula:



wherein R_1 and R_2 are divalent organic moieties that may be the same or different; and

- 20 wherein G_1 through G_{29} is hydrogen; phenyl; or substituted or unsubstituted alkyl or alkene groups having from 1 to about 10 carbon atoms.